

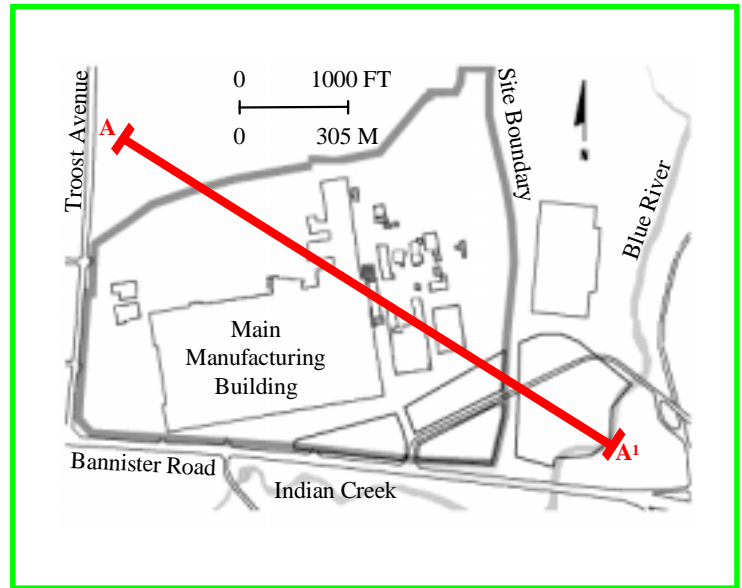
## Vadose Zone Fact Sheet Kansas City Plant

**Background:** The Kansas City Plant is a 120-hectare (300-acre) site located 19.2 km (12 mi) south of downtown Kansas City, Missouri. The Department of Energy occupies 56.4 hectares (141 acres) of this reservation. The current mission of the plant is the manufacturing of non-nuclear components for nuclear weapons and the machining of electrical, electromechanical, mechanical, and plastic components.

**Issues:** Various spills and leaks from production activities have resulted in soil and ground water contamination.

**Vadose zone infiltration:** The recharge through the vadose zone is estimated to be 9.9 cm (3.5 in) per year.

**Vadose zone characterization/remediation:** Characterization has been completed for all but one contaminated site. Of 43 potential release sites that have been identified, 42 have been either cleaned up or submitted for no further action, or institutional controls have been proposed and accepted until/unless cost effective cleanup methods are discovered. Regulators have agreed to institutional control for inaccessible contaminated areas under active buildings until the buildings are no longer in use. The most visible project so far has been the Abandoned Indian Creek Outfall (AICO) with excavations of over 27,000 tons of soil and waste material contaminated with polychlorinated biphenyl (PCB) being transported and disposed off-site at a Toxic Substance Control Act (TSCA) approved landfill.



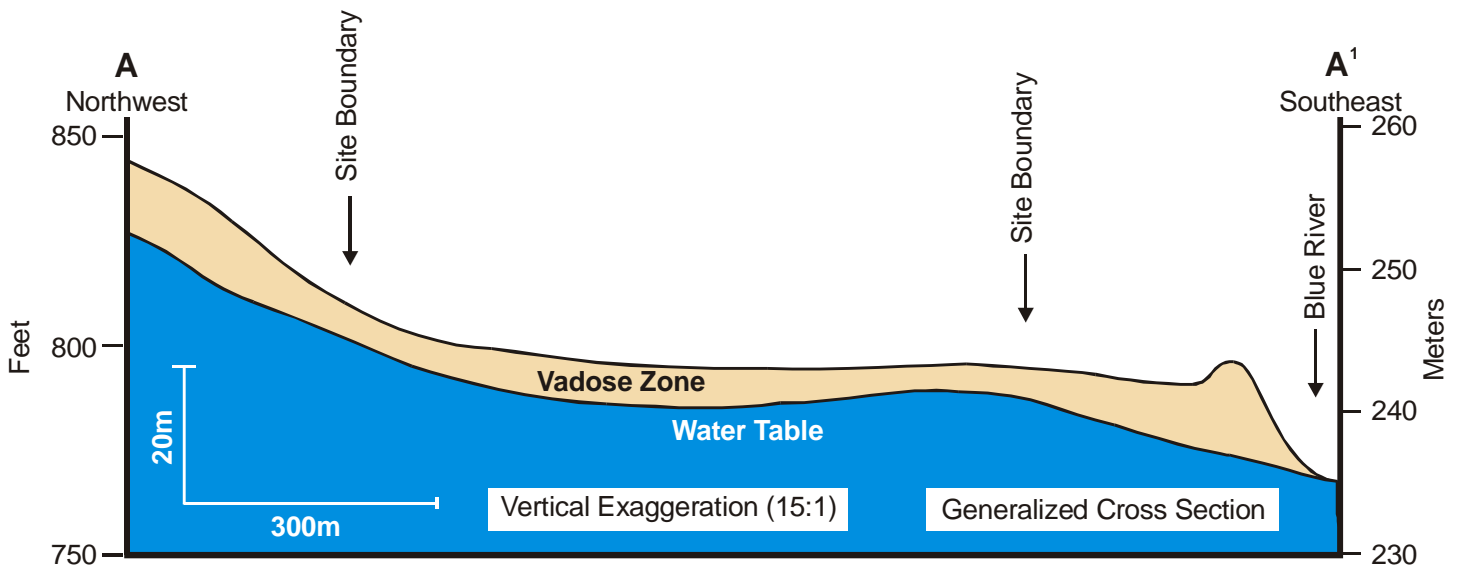
**Precipitation:** Average annual precipitation is 100 cm (37 in) per year.

**Surface Waters:** The site is bordered by Indian Creek to the south and Blue River to the east.

**Geology:** Low hills nearly encircle the plant, which is situated in the Blue River Valley, approximately 244 m (800 ft) above sea level. Alluvial deposits overlie shale and sandstone bedrock.

**Vadose zone thickness:** The vadose zone ranges in thickness from 0.6 to 3 m (2 to 10 ft).

**Major contaminants of concern:** Soil is contaminated with volatile organic compounds, PCB, and petroleum products. Ground water contamination is mainly trichloroethylene and its degradation products 1,2-dichloroethylene, and vinyl chloride.



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## Ground Water Fact Sheet Kansas City Plant

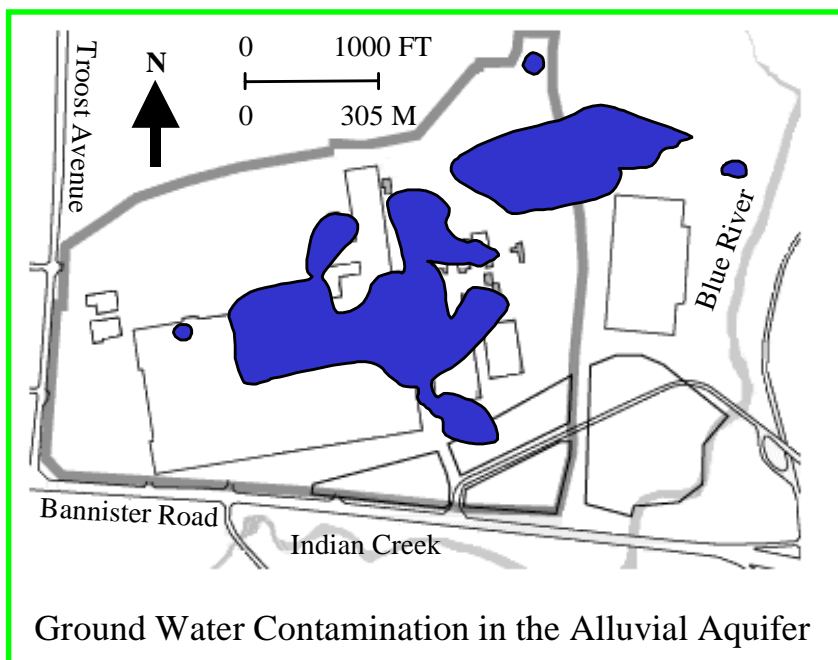
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**Hydrogeology:** An alluvial aquifer approximately 12 m (40 ft) thick overlies shale and sandstone bedrock. The aquifer is low yield and moderately saline. Ground water flows from the Plant toward the Blue River and Indian Creek. The ground water velocity ranges from 15 to 914 m (50 to 3000 ft) per year.

**Issues:** Underground utilities and numerous excavation and fill events complicate contaminant migration. These features may provide preferential flow paths for ground water contamination.

**Ground water characterization/remediation:** The initiation of the preferred corrective measures occurred in the fall of 1990: pump and treat utilizing ultraviolet light/oxidation for treatment. Over 530 million liters (140 million gallons) of ground water have been treated for volatile organic compound (VOC) destruction. Treatment will soon begin on recently discovered contaminated ground water at the southeast parking lot. Although the ground water plume discharges directly to the Blue River, data suggests that the seepage does not affect the water quality. A deep soil mixing technology was demonstrated in 1996 to remove VOCs from ground water. A zero-valence iron filing trench has been installed and monitoring continues to verify destruction of VOCs in the ground water. Dense non-aqueous phase liquids (DNAPLs) are present in the fine-grained aquifer material.

**Ground water use:** A study conducted in 1992 revealed no local ground water use, partially due to the salinity and low yield of the aquifer. There are no public ground water supply wells within a 6.4 km (4 mi) radius of the facility.



Plume Designation	Contaminants	Depth	Remedial Approach
Blue River	Vinyl Chloride	15 m (50 ft)	Pump and treat; iron wall
Indian Creek	Trichloroethylene (TCE)	15 m (50 ft)	Pump and treat